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09/732,958	12/08/2000	Ridwan Sartiono	11150/27	2788

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EXAMINER	
GARCIA OTERO, EDUARDO	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/732,958	SARTIONO ET AL.	
	Examiner	Art Unit	
	Eduardo Garcia-Otero	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/20/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION: Final

Introduction

1. Title is: Design system and method for designing or constructing new parts.
2. First named inventor is: Sartiono.
3. Claims 1-23 have been submitted, examined, and rejected.
4. Priority is claimed to German application filed 12/10/1999.
5. Applicant's Response and IDS were received 8/20/04. No claims were amended.

Index of Important Prior Art

6. **Foley** refers to "Computer Graphics Principles and Practice" by James D. Foley et. al., Second Edition, 1996, ISBN 0-201-84840-6, pages 660-665. Note that Applicant has provided pages 660-663 in an information disclosure statement. However, pages 664-665 are provided by the Examiner in a PTO form 892.
7. **AutoCAD14** refers to "AutoCAD Release 14 User's Guide" by AutoDesk, 1998, table of contents pages iii to xvi, and Glossary pages 737-748, and Index pages 749-799.
8. **Xavier** refers to US patent 6,407,748.

Applicant's Remarks

9. Applicant has satisfied the request for information: ISO 10303 discussed at specification page 1, "Standard for the Exchange of Product Model Data".
10. All prior indefiniteness rejections are withdrawn, per Applicant's persuasive assertions at Remarks pages 2-3.
11. Regarding Claim 1, Applicant asserts that the prior art does not disclose positioning "of preexisting parts relative to a design space of a ***part to be designed***". Emphasis in original. Applicant asserts that the prior art (contrarily, or merely) performs calculations to determine whether two parts that have been designed intersect.
12. Applicant is correct that the discussion of prior art in the Specification page 1 uses slightly different terminology: "saved in a vehicle data base for collision testing... repeated several times... until the newly-designed part can be properly inserted between the parts already present", and does not address collisions with a design space of a part to be designed.
13. However, the design space (of a part to be designed) appears disclosed by Foley's page 660 "bounding volumes" and page 664 "spacial partitioning" in order to restrict the number of

object comparisons made. In other words, a bounding volume (generally with simple geometry) is used for preliminary collision calculations.

14. Thus, the 35 USC 103(a) rejections are maintained, and are repeated below.

Claim Interpretation

15. The claim language is interpreted in light of the specification. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).
16. First, claim 1 term **"CAx"** is defined as "CAD, CAE, or CAM systems" at specification page 1, also see page 5. For simplicity, in the rejections the Examiner will simply use the term "CAD" broadly as referring to CAD or CAE or CAM.
17. Second, the claim 1 term **"overlap and border"** is interpreted as "that overlap and/or border". See specification page 2 line 13 "overlap or border". Further, said term "overlap and border" is interpreted as equivalent to Foley's term "intersection test" at page 662, where adjacency is included in the intersection calculation ("$o \leq b$")
18. Third, the claim 1 term **"design space"** is interpreted as either "bounding volume" per Foley page 660 ("Extants can be used as in Chapter 7 to surround the objects themselves rather than their projections: in this case the extants become solids and are also known as *bounding volumes*"), or as "spacial partitions" per Foley page 664 that states "*Spacial partitioning* (also known as *spacial subdivision*) allows us to break down a large problem into a number of smaller ones. The basic approach is to assign objects or their projections to spacially coherent groups as a preprocessing step. For example, we can divide the projection plane with a regular 2D rectangular grid and determine in which grid spaces each object's projection lies. Projections need to be compared for overlap with only those other projections that fall within their grid boxes... 3D grid... The process of determining which objects intersect with a projector can then be sped up by first determining which partitions the projector intersection, and then testing only the objects lying within those partitions (Sections 15.10). If the objects being depicted are unequally distributed in space, it may be more efficient to use adaptive partitioning, in which the size of each partition varies."

19. Fourth, the claim 1 term **"data circuit"** is interpreted broadly as including standard communication hardware, related software, and related interfaces. For example, including data bus, local area networks, and Internet.
20. Said interpretations are maintained throughout the claims.

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action: (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
22. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: Determining the scope and contents of the prior art. Ascertaining the differences between the prior art and the claims at issue. Resolving the level of ordinary skill in the pertinent art. Considering objective evidence present in the application indicating obviousness or nonobviousness.
23. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable.
24. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admissions in view of Foley.
25. Independent claim 1 is "design system" claim with 8 limitations, numbered by the Examiner for clarity.
26. [1]-**"at least one CAx system"** is disclosed by Applicant's Admission specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other".
27. **Regarding admissions,** MPEP § 2129 states "When applicant states that something is prior art, it is taken as being available as prior art against the claims". *In re Nomiya*, 509 F.2d 566,

184 USPQ 607, 611 (CCPA 1975) states "admissions...may be considered "prior art" for any purpose, including use as evidence of obviousness under § 103". *Constant v. Advanced Micro-Devices,* 848 F2d 1560, 1570, 7 USPQ2d 1057, 1063 (Fed. Cir. 1988), "[Applicant's] own admission during prosecution...is binding upon him". Additionally, U.S. Patent and Trademark Office (USPTO), Formulating and Communicating Rejections Under 35 U.S.C. 1037 (Feb. 13, 1991) states when relying on an admission as evidence of obviousness, moreover, it is unnecessary to cite a corroborating reference to support the admission. Also see 37 C.F.R. § 1.104(c)(3).

28. [2]-**"at least one central data base connected to the at least one CAx system via a data circuit configured to exchange data"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... If an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing...".
29. Note that the saving in a "vehicle data base for collision testing" implies saving from CAD system X via a data circuit or data bus to the vehicle data base.
30. [3]-**"an input device configured to define a design space for a part to be designed and to design the part to be designed in the design space"** is disclosed by Applicant's Admission specification page 1 line 15-26 "In the field of vehicle construction, using a vehicle as a design unit, a first CAD system Y can thus, for instance, be used in the body design, and a second CAD system X can be used in the engine and chassis design...".
31. Note that "If an engine part is designed in CAD system X... If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X" implies that the CAD system has input devices, and said input devices define the part and define the location of the part.
32. [4]-**"a display device configured to display the design space, a design-space environment and parts"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... If an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD

system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present..."

33. Note that it is CAD systems implicitly display the design space, environment, and parts in order to visually examine the area of collision.
34. [5]-**"a copying device configured to copy the design space to the central data base"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the formant of CAD system Y, and saved in a vehicle data base for collision testing".
35. [6]-**"the central data base is configured to access the preexisting parts of at least one design unit"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X".
36. [8]-**"a copying device configured to copy to the CAx system as a design-space environment the selected parts with data representing a position of the selected parts relative to the design space"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
37. Note that claim 1 appears to intend to perform the intersection calculations in one of the originating CAx systems (CAD system X format in Applicant's example), rather than in the overall vehicle data base CAx system (CAD system Y format in Applicant's example).

However, Applicant's Admission discloses facile and apparently automatic translation among the system formats using ISO 10303. Performing said intersection calculations in CAD system X rather than CAD system Y appears to be merely changing the location (or CAD system) of the calculations, and does not appear to be invention. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70, 73 (CCPA 1950) states "no invention in shifting the starting switch disclosed by Cannon to a different position since the operation of the device would not thereby be modified", and *In re Kuhle,* 526 F.2d 553, 188 USPQ 7 (CCPA 1975) states "the particular placement provided no novel or unexpected result". See also MPEP § 2144.04(VI)(C). In this claim, changing the location or format of the intersection calculations does not modify the operation, does not provide novel results, and does not provide unexpected results.

38. The remaining limitation is not expressly disclosed by Applicant's Admissions.

39. [7]-**"a selection device configured to select the preexisting parts of the design unit that at least one of overlap and border on the design space of the par to be designed and to select the preexisting parts, the design spaces of which at least one of overlap and border on the design space of the part to be designed"** is disclosed by Foley page 660 "bounding volumes", and page 664 "*Spacial partitioning* (also known as *spacial subdivision*) allows us to break down a large problem into a number of smaller ones. The basic approach is to assign objects or their projections to spacially coherent groups as a preprocessing step. For example, we can divide the projection plane with a regular 2D rectangular grid and determine in which grid spaces each object's projection lies. Projections need to be compared for overlap with only those other projections that fall within their grid boxes... 3D grid... The process of determining which objects intersect with a projector can then be sped up by first determining which partitions the projector intersection, and then testing only the objects lying within those partitions (Sections 15.10). If the objects being depicted are unequally distributed in space, it may be more efficient to use adaptive partitioning, in which the size of each partition varies." And is also disclosed by Foley FIG 15.8 "Hierarchy can be used to restrict the number of object comparisons needed." Hierarchy is a form of spacial subdivision.

40. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Foley to modify Applicant's Admission. One of ordinary skill in the art would have been motivated to do this in order to "sped up" the intersection or collision calculation by "testing only the objects lying within those partitions" per Foley page 664. All objects lying outside of the partitions of interest (or "design spaces" using Applicant's terminology) are excluded from further consideration and calculations.
41. Note that Foley's "spacial partitions" from page 664 may also be used simultaneously with Foley's "bounding volumes" from page 660. In other words, the whole design universe may be subdivided into "spacial partitions" (fixed), and/or specific entities may be enclosed in "bounding volumes" (mobile).
42. Claim 1 is ambiguous regarding whether a specific design entity (the part being designed) is enclosed by a fixed "spacial partition", or is enclosed by an associated mobile "bounding volume" which moves as the specific design entity moves. In virtual reality, typically the part which is moving is enclosed by an associated mobile and similarly moving "bounding volume", and collision detection/avoidance calculations are performed only against other entities in intersecting "bounding volumes" or against other entities in intersecting "spacial partitions". Thus, claim 1 is interpreted broadly as claiming either fixed "spacial partitions" or mobile "bounding volumes".
43. Claims 2-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admissions in view of Foley.
44. Claims 2-10 depend from claim 1 directly or indirectly.
45. In claim 2, there are 3 limitations:
46. [1]-**"the central data base includes a storage device configured to store data representing a finished part"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing".
47. [3]-**"data representing an installation position of the finished part, the finished part being designated in accordance with the CAx system"** is disclosed by Applicant's

Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the formant of CAD system Y, and saved in a vehicle data base for collision testing".

48. The remaining limitation is not expressly disclosed by Applicant's Admissions.

49. [2]-**"data representing the design space of the finished part"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy".

50. In claim 3, **"the CAx system includes a storage device configured to store data representing a design-space environment corresponding to the part to be designed"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy".

51. In claim 4, **"organizational data related to the parts of the design-space environment, the organizational data being selectively available to a user and including, for each part of the design-space environment, data representing at least one of a number, a part number, a version number, a designation, a status and a note"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing".

52. In claim 5, **"the status includes at least one of a new status and a modified status"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing". Note that CAD systems generally track and document modifications to the part, and that lack of any modifications indicates a new status. Similarly, said status may be explicitly displayed as a distinct attribute.

53. In claim 6, there are 8 limitations:

54. [7]-**"a name of a file of a design-space-environment assembly"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing".

55. [8]-**"data representing the parts of the design-space environment in a format used by the CAx system"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing".

56. The remaining limitations are not expressly disclosed by Applicant's Admissions.

57. [1]-**"design-space-environmental data assigned to a part"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy". Note that "Hierarchy" is a form of organization, and implies that a file contains organizational data regarding what objects are in what spacial partitions (similar to the way a road map typically contains an alphabetical list of the roads stating which map grids the road intersects: for example, B4, C4, C5.

58. [2]-**"a design-space-environment flag indicating whether a design space environment is stored for the part"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy". Note that "Hierarchy" is a form of organization, and implies that a file contains organizational data regarding what objects are in what spacial partitions (similar to the way a road map typically contains an alphabetical list of the roads stating which map grids the road intersects: for example, B4, C4, C5.

59. [3]-**"a name of a design-space-environment storage file assigned to a file that includes the data for the part to be designed"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page

665 "Hierarchy". Note that FIG 15.18 uses names for the spacial partitions: "Floor 1" and "Room 2".

60. [4]-**"a name of a file that includes an organizational table containing the organizational data for the parts of the design-space environment"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy". Note that "Hierarchy" is a form of organization, and implies that a file contains organizational data regarding what objects are in what spacial partitions (similar to the way a road map typically contains an alphabetical list of the roads stating which map grids the road intersects: for example, B4, C4, C5.
61. [5]-**"the definition of the design space for the part to be designed"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy". Note that "Hierarchy" is a form of organization, and implies that a file contains organizational data regarding what objects are in what spacial partitions (similar to the way a road map typically contains an alphabetical list of the roads stating which map grids the road intersects: for example, B4, C4, C5.
62. [6]-**"a list of the design spaces for the parts of the design-space environment"** is disclosed by Foley page page 660 "bounding volumes" and page 664 "*Spacial partitioning* (also known as *spacial subdivision*)" and page 665 "Hierarchy". Note that "Hierarchy" is a form of organization, and implies that a file contains organizational data regarding what objects are in what spacial partitions (similar to the way a road map typically contains an alphabetical list of the roads stating which map grids the road intersects: for example, B4, C4, C5.
63. In claim 7, **"the design system includes a plurality of CAx systems, each of the CAx systems being connected to the at least one central data base via the data circuit"** is
64. disclosed by Applicant's Admission specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other".

65. In claim 8, **"a plurality of central data bases, each of the central data bases being connected to the at least one CAx system via the data circuit, a first central data base being selectable via the CAx system used for the part to be designed"** is disclosed by Applicant's Admission specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other". Note that claim 8 appears to merely duplicate the single central data base of Applicant's Admission. See *In re Harza* (legal precedent for duplication), 274 F.2d 669, 124 USPQ 378, 380 (CCPA 1960) which states "It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced". Also see MPEP 2144.04(VI)(B). In this claim, duplicating the part does not produce any new result and does not produce any unexpected result.
66. In claim 9, **"an adapter connecting the data circuit and the at least one CAx system and an application programming interface connecting the data circuit and the at least one central data bus, wherein the adapter, the application programming interface and data circuit are configured to transmit data between the at least one CAx system and the at least one central data base"** is disclosed by Applicant's Admission specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other".
67. In claim 10, **"the design unit includes a motor vehicle"** is disclosed by Applicant's Admission specification page 1 line 15 "field of vehicle construction".
68. MOTIVATION FOR CLAIMS 2-10. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use Foley to modify Applicant's

Admission. One of ordinary skill in the art would have been motivated to do this in order to "sped up" the intersection or collision calculations by "testing only the objects lying within those partitions" per Foley page 664. All objects lying outside of the partitions of interest (or "design spaces" using Applicant's terminology) are excluded from further consideration and calculations.

69. Note that Foley's "spacial partitions" from page 664 may also be used simultaneously with Foley's "bounding volumes" from page 660. In other words, the whole design universe may be subdivided into "spacial partitions" (fixed), and/or specific entities may be enclosed in "bounding volumes" (often mobile). Additionally, note that Applicant's Admission discloses "Numerous CAx systems", and is interpreted broadly as disclosing standard CAD functions such as naming parts, positioning parts, defining relationships to other parts, storing data, displaying parts, and so forth to one of ordinary skill in the art.
70. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admissions in view of Foley.
71. Independent claim 1 is "method" claim with 4 limitations, labeled (a) through (d) by Applicant.
72. (a)-**"copying to the central data base a design space defined in the CAx system by a user and relating to a part to be designed"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
73. **Regarding admissions,** MPEP § 2129 states "When applicant states that something is prior art, it is taken as being available as prior art against the claims". *In re Nomiya*, 509 F.2d 566, 184 USPQ 607, 611 (CCPA 1975) states "admissions...may be considered "prior art" for any purpose, including use as evidence of obviousness under § 103". *Constant v. Advanced*

Micro-Devices, 848 F2d 1560, 1570, 7 USPQ2d 1057, 1063 (Fed. Cir. 1988), "[Applicant's] own admission during prosecution...is binding upon him". Additionally, U.S. Patent and Trademark Office (USPTO), Formulating and Communicating Rejections Under 35 U.S.C. 1037 (Feb. 13, 1991) states when relying on an admission as evidence of obviousness, moreover, it is unnecessary to cite a corroborating reference to support the admission. Also see 37 C.F.R. § 1.104(c)(3).

74. (c)-**"copying to the CAx system the determined preexisiting parts and data representing a position of the predetermined preexisting parts relative to the design space of the part to be design"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
75. (d)-**"displaying the determined preexisting parts in a correct position relative to the design space of the part to be designed as a design-space environment for designing the part to be designed"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
76. Applicant's Admission does not expressly disclose the remaining limitations.
77. (b)-**"determining, in accordance with the central data base, preexisiting parts of the design unit that at least one of border on and overlap the design space of the part to be**

designed and preexising parts having design spaces that at least one of border on and overlap the design space of the part to be designed" is disclosed by Foley page 660 "bounding volumes", and page 664 "*Spacial partitioning* (also known as *spacial subdivision*) allows us to break down a large problem into a number of smaller ones. The basic approach is to assign objects or their projections to spacially coherent groups as a preprocessing step. For example, we can divide the projection plane with a regular 2D rectangular grid and determine in which grid spaces each object's projection lies. Projections need to be compared for overlap with only those other projections that fall within their grid boxes... 3D grid... The process of determining which objects intersect with a projector can then be sped up by first determining which partitions the projector intersection, and then testing only the objects lying within those partitions (Sections 15.10). If the objects being depicted are unequally distributed in space, it may be more efficient to use adaptive partitioning, in which the size of each partition varies." And is also disclosed by Foley FIG 15.8 "Hierarchy can be used to restrict the number of object comparisons needed." Hierarchy is a form of spacial subdivision.

78. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Foley to modify Applicant's Admission. One of ordinary skill in the art would have been motivated to do this in order to "sped up" the intersection or collision calculation by "testing only the objects lying within those partitions" per Foley page 664. All objects lying outside of the partitions of interest (or "design spaces" using Applicant's terminology) are excluded from further consideration and calculations.
79. Note that Foley's "spacial partitions" from page 664 may also be used simultaneously with Foley's "bounding volumes" from page 660. In other words, the whole design universe may be subdivided into "spacial partitions" (fixed), and/or specific entities may be enclosed in "bounding volumes" (mobile).
80. Claim 11 is ambiguous regarding whether a specific design entity (the part being designed) is enclosed by a fixed "spacial partition", or is enclosed by an associated mobile "bounding volume" which moves as the specific design entity moves. In virtual reality, typically the part which is moving is enclosed by an associated mobile and similarly moving "bounding volume", and collision detection/avoidance calculations are performed only against other

entities in intersecting "bounding volumes" or against other entities in intersecting "spacial partitions". Thus, claim 11 is interpreted broadly as claiming either fixed "spacial partitions" or mobile "bounding volumes".

81. Note that claim 11 appears to intend to perform the intersection calculations in one of the originating CAx systems (CAD system X format in Applicant's example), rather than in the overall vehicle data base CAx system (CAD system Y format in Applicant's example). However, Applicant's Admission discloses facile and apparently automatic translation among the system formats using ISO 10303. Performing said intersection calculations in CAD system X rather than CAD system Y appears to be merely changing the location (or CAD system) of the calculations, and does not appear to be invention. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70, 73 (CCPA 1950) states "no invention in shifting the starting switch disclosed by Cannon to a different position since the operation of the device would not thereby be modified", and *In re Kuhle,* 526 F.2d 553, 188 USPQ 7 (CCPA 1975) states "the particular placement provided no novel or unexpected result". See also MPEP § 2144.04(VI)(C). In this claim, changing the location or format of the intersection calculations does not modify the operation, does not provide novel results, and does not provide unexpected results.
82. Claims 12-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admissions in view of Foley.
83. Claims 12-23 depend from claim 12 directly or indirectly.
84. In claim 12, there are 4 limitations:
85. [2]-**"copying the initially determined design spaces to the CAx system"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".

86. [4]-**"copying one of (sic) in detail form and completely from the central data base to the CAx system preexisiting parts contained within selected design spaces and in accordance with the size adjustment"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
87. Applicant's Admission does not expressly disclose the remaining limitations.
88. [1]-**"initially determining in the central data base the design spaces of preexising parts that at least one of border on and overlap the design space of the part to be designed"** is disclosed by Foley page 660 "bounding volumes", and page 664 "*Spacial partitioning* (also known as *spacial subdivision*) allows us to break down a large problem into a number of smaller ones. The basic approach is to assign objects or their projections to spacially coherent groups as a preprocessing step. For example, we can divide the projection plane with a regular 2D rectangular grid and determine in which grid spaces each object's projection lies. Projections need to be compared for overlap with only those other projections that fall within their grid boxes... 3D grid... The process of determining which objects intersect with a projector can then be sped up by first determining which partitions the projector intersection, and then testing only the objects lying within those partitions (Sections 15.10). If the objects being depicted are unequally distributed in space, it may be more efficient to use adaptive partitioning, in which the size of each partition varies." And is also disclosed by Foley FIG 15.8 "Hierarchy can be used to restrict the number of object comparisons needed." Hierarchy is a form of spacial subdivision.
89. [3]-**"copying to the central data base preexisiting design spaces that have been selected by a user and preexisting design spaces that have been adjusted in size"** is disclosed by Foley page 660 "bounding volumes", and page 664 "*Spacial partitioning* (also known as

spacial subdivision)... If the objects being depicted are unequally distributed in space, it may be more efficient to use adaptive partitioning, in which the size of each partition varies."

90. In claim 13, **"making the design-space environment visible and invisible in accordance with an input of the user while the user is designing the part to be designed"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems". Hiding and/or layering are standard CAD functions. Similarly, storing data, updating, and displaying are also standard CAD functions.
91. In claim 14, **"storing data representing the design-space environment corresponding to the part to be designed with data representing the part to be designed"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".
92. In claim 15, **"updating the design-space environment while designing the part to be designed"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".
93. In claim 16, **"copying and updating only modified parts from the central data base to the CAx system in accordance with the design-space environment updating step"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".
94. In claim 17, **"the design unit includes a motor vehicle, the central data base being configured to access the parts to a plurality of motor vehicles and wherein the method further comprises the step of requesting the design-space environment for a specific vehicle for the part to be designed"** is Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".
95. In claim 18, there are 4 limitations:
96. [2]-**"determining at least one of the parts and the design spaces of the parts in the central data base in a design-unit coordinate system"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in

accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".

97. [3]-**"copying design spaces from the CAx system to the central data base to determine existing parts being transformed from the design-space coordinate system to the design-unit coordinate system"** is disclosed by Applicant's Admission specification page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".
98. [4]-**"transforming the copied design spaces and preexisting parts from the design-unit coordinate system to the design-space coordinate system"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other". Said coordination includes coordinate system transformations between CAD systems.
99. Applicant's Admission does not expressly disclose the remaining limitations.
100. [1]-**"representing the design space and the design-space environment in the CAx system in a design-space coordinate system"** is disclosed by Foley page 660 "bounding volumes", and page 664 "*Spacial partitioning* (also known as *spacial subdivision*) allows us to break down a large problem into a number of smaller ones. The basic approach is to assign objects or their projections to spacially coherent groups as a preprocessing step. For example, we can divide the projection plane with a regular 2D rectangular grid and determine in which grid spaces each object's projection lies. Projections need to be compared for overlap with only those other projections that fall within their grid boxes... 3D grid... The

process of determining which objects intersect with a projector can then be sped up by first determining which partitions the projector intersection, and then testing only the objects lying within those partitions (Sections 15.10)." Note Foley's coordinate system at page 660 FIG 15.13, which shows the projections (transformations) of objects, and projections (transformations) of the "bounding boxes" of said objects. Foley's transformation is from a 3D to a projected 2D coordinate system.

101. In claim 19, **"converting by the CAx system for the part to be designed data representing the design-space environment into a formatn usable by the CAx system if the data representing the preexising parts is received in a different format"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other" and page 1 line 15-26 "... an engine part is then designed in CAD system X, then the part is subsequently converted, using standard format STEP (Standard for the exchange of Product Model Data: international standard for a product data model, in accordance with ISO 10303) into the format of CAD system Y, and saved in a vehicle data base for collision testing. If discrepancies occur during collision testing, then the engine parts must be appropriately modified in CAD system X. This procedure may have to be repeated several times, until the vehicle data base reveals that the newly-designed part can be properly inserted between the parts already present...".

102. In claim 20, **"temporarily storing in the CAx system data for managing the parts of the design-space environment, the data for managing the parts of the design-space environment being accessible by the user"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".

103. In claim 21, **"the data for managing the parts of the design-space environment includes data representing at least one of a part number, a version number and a designation"** is disclosed by Applicant's Admission at specification page 1 line 9 "Numerous CAx systems such as CAD, CAE, or CAM systems... must be coordinated with each other".

104. In claim 22, **"the at least one central data base includes a plurality of central data bases, the method further comprising the step of determining the design-space environment in accordance with a selected one of the central data bases"** is disclosed by Applicant's Admission specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other". See *In re Harza* (legal precedent for duplication), 274 F.2d 669, 124 USPQ 378, 380 (CCPA 1960) which states "It is well settled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced". See MPEP 2144.04(VI)(B). In this claim, duplicating the part does not produce any new result and does not produce any unexpected result.

105. In claim 23, **"copying a finished part to the central data base, the finished part selectively representing a component of a subsequently defined design-space environment"** is disclosed by Applicant's Admission at specification page 1 line 9-14 "Numerous CAx systems such as CAD, CAE, or CAM systems, which are used as CAD/CAE/CAM models for designing parts presently exist. Similarly, it is conventional to use design systems, which include a plurality of CAx systems and a central data base connected to the CAx systems, since, in order to plan a design unit, several CAx systems are often used within a company, for various design areas that must be coordinated with each other".

106. MOTIVATION FOR CLAIMS 12-23. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use Foley to modify Applicant's Admission. One of ordinary skill in the art would have been motivated to do this in order to "sped up" the intersection or collision calculations by "testing only the objects lying within those partitions" per Foley page 664. All objects lying outside of the partitions of interest (or "design spaces" using Applicant's terminology) are excluded from further consideration and calculations.

107. Note that Foley's "spacial partitions" from page 664 may also be used simultaneously with Foley's "bounding volumes" from page 660. In other words, the whole design universe may be subdivided into "spacial partitions" (fixed), and/or specific entities may be enclosed in "bounding volumes" (often mobile). Additionally, note that Applicant's Admission discloses "Numerous CAx systems", and is interpreted broadly as disclosing standard CAD functions such as naming parts, positioning parts, defining relationships to other parts, storing data, displaying parts, and so forth to one of ordinary skill in the art.

Conclusion

108. All pending claims stand rejected.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo Garcia-Otero whose telephone number is 703-305-0857. The examiner can normally be reached on Tuesday through Friday from 9:00 AM to 8:00 PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for this group is 703-872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

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